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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

MAILED

APR 1 1 2007

Group 3700

Application Number: 10/734,566
Filing Date: December 12, 2003
Appellant(s): LIHL ET AL.

C. Richard Lohrman
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 02 March 07 appealing from the Office action mailed 27 October 06.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon (in order of appearance)

5,535,654	Niesporek et al.	July 1996
5,822,970	Guttler	October 1998
6,532,719	Hannen et al.	March 2003
4,603,848	Markgraf et al.	August 1986
5,004,392	Naab	April 1991
5,327,763	Kramer et al.	July 1994
6,641,135	Weinheimer	November 2003
6,253,653	Walter et al.	July 2001
5,065,657	Pfeifer	November 1991
3,785,234	Sitte	January 1974
5,761,977	Jakobi et al.	June 1998
4,511,224	Sitte et al.	April 1985
4,532,838	Soderkvist	August 1985
5,488,886	Mohr	February 1996
5,787,776	Nishimoto	August 1998
5,609,083	Persson	March 1997
5,181,443	Sitte et al.	January 1993
4,395,075	Barrett et al.	July 1983

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Rejection #1 using Niesporak et al.'654 as the base reference.

Claims 2-7 and 9 are rejected under 35 U.S.C. 103(a).

The patent to Niesporek et al.'654 shows a microtome having most of the recited limitations including a sensing device (20,44) controlling a feeder device (50) at different speeds (coarse speed, slicing speed).

Niesporak determines the position of the sample relative to the blade via a contact sensor (20) rather than a light barrier sensor.

Examiner notes that contact sensors and light barrier sensors are both very old and well known and also are art recognized equivalents. When sensing the position of a workpiece or tool part, one of ordinary skill would know that he has a choice between a contact sensor and a light barrier sensor. Evidence of this can be seen in numerous patents. See, for example, Guttler '970 (lines 23,24, column 6), Hannen et al.'719 (lines 51,52, column 3), Markgraf et al.'848 (lines 29-31, column 8), Naab '392 (lines 15-17, column 10), Kramer et al.'763 (lines 53,54, column 4) and Weinheimer '135 (lines 64,65, column 7). It would have been obvious to one of ordinary skill in the art to have modified Niesporak by making his contact sensor be a light barrier, since these are art recognized equivalents as set forth above, and also since light sensors (having no moving parts) are less likely to break.

If there is any doubt about the efficacy of light barrier sensors within microtomes, Examiner notes that light barrier sensors have long been employed for various purposes within microtomes. Evidence of this can be seen in numerous patents. See, for example, Walter et al.'653 (line 45, column 5), Pfeifer '657 (lines 39,40, column 3), Sitte '234 (lines 1-6, column 6) and Niesporak et al.'654 himself (line 63, column 4). Another important reference is the patent to Jakobi et al.'977, who discloses a light barrier for positioning the specimen height (lines 49-51, column 7). Examiner notes the difference between setting specimen height, as in Jacobi, and setting the proximity of the specimen to the blade, as in Niesporak and Appellant's device, but this is a very valuable teaching anyway. There is certainly room for the light barrier at the height of the knife as seen in Sitte et al.'224, who has illumination lights in that area. The most important reference is Soderkvist '838, which shows a light barrier in the same location and for the same purpose as Appellant's. Soderkvist's light barrier is perpendicular to the knife edge, and he stops near 1μm instead of the claims "few μm", but the teachings are quite important nonetheless.

Also of interest, and making the modification even more obvious, is a patent to Mohr '886, who shows in figure 6 the use of a light barrier parallel to the knife edge for the purpose of prepositioning the knife (7) relative to the workpiece (19) prior to initiation of the cutting cycle. Further of interest is a patent to Nishimoto '776 showing a light barrier (21,22) sensing the location of the specimen (meat) relative to the blade (31) and using that info to control the specimen advancement (lines 24-64, column 5).

With regards to claims 3,5 and 6 (not argued separately), Niesporak's sensor is stationary and coupled to the knife holder.

With regards to claim 4 (not argued separately),, any light barrier emits electromagnetic radiation. Appellant's range-within-a-range limitations of a laser or LED is not considered to further limit the claims. If Appellant would like Examiner to give weight to the laser or LED, Appellant should change the claim the laser or LED outside of a range-within-a-range. Nevertheless, Examiner takes Official Notice that it is well known to employ lasers or LEDs in light barriers, and It would have been obvious to one of ordinary skill in the art to have used a laser or LED in Niesporak's light barrier.

With regards to claim 7 (not argued separately),, Niesporak drives the specimen at different speeds (lines 51-54, column 4).

With regards to the limitation of the device being an ultramicrotome (as opposed to a normal microtome), Examiner notes that the definition of an ultramicrotome is *"a device adapted to produce specimen slices with thicknesses on the order of nanometers"* (see Barrett et al.'075, lines 61-63, column 2). Niesporak's microtome is silent on the thickness of his slices, and therefor it is not necessarily an ultramicrotome. However, as seen in the art of record (Persson '083, Soderkvist '838, Sitte '234, Sitte '443, Sitte '224 and many others), ultramicrotomes operate in largely the same fashion as microtomes do, with a stationary blade and an advancing specimen. The most significant differences are simply matters of scale, moving from micrometers to nanometers. It is clear from looking at these that teachings from microtomes are largely applicable to ultramicrotomes. In particular, the teachings of Niesporak's sensor and

drive control, as modified above, are readily adaptable to an ultramicrotome, for the purpose of adding course and fine drive features to speed up the entire process. As defined by Barrett et al.'075 above, ultramicrotomes intrinsically can cut slices under 300 nanometers.

With regards to the limitation of the light barrier-knife spacing being "a few micrometers" (claim 9) and the sensor being at the height of the blade (claim 2), Examiner notes that determining a location for the sensor is within the capabilities of one of ordinary skill. In order to fulfill the function of Niesporak's modified sensor, one of ordinary skill could find numerous places to place the light sensor, including at the height of the knife and at "a few micrometers" spacing. See In re Japikse, 86 USPQ 70 for a discussion on the obviousness of shifting parts locations.

Rejection #2 using Soderkvist '838 as the base reference.

Claims 2-7 and 9 are rejected under 35 U.S.C. 103(a).

Soderkvist '838 shows an ultramicrotome with most of the recited limitations including a knife (1), a knife holder (8,10), a specimen holder (15), a linear feed device (lines 11-15, column 3) and a light barrier with a transmitter (3) and a receiver (9).

Since Soderkvist is an ultramicrotome, by definition it cuts slices thinner than 300 nanometers (see Barrett et al.'075, lines 61-63, column 2).

In regards to claim 2 (not argued separately), the light barrier crosses the height of the knife as seen in figure 1.

With regards to claims 3 and 5 (not argued separately),, Soderkvist's sensor is coupled to the knife holder.

With regards to claims 9 and 6, Soderkvist's light barrier extends perpendicular to the knife edge, as opposed to being parallel to the knife edge (claim 9) and stationary (claim 6). Soderkvist's light barrier is a rather complex system, involving mirrors, reflections and transmitter adjustments. Examiner notes that it is much more common to employ a simple light barrier system, such as that seen in Jakobi '977 (lines 48-50, column 7), Nishimoto '776 (21,22) or Mohr '886 (figure 6, parallel to knife edge). It would have been obvious to one of ordinary skill in the art to have modified Soderkvist by employing the simpler stationary light barrier, as shown by Jakobi, Nishimoto and Mohr, since these are art recognized equivalents known for the same purpose, and to have made it parallel to the knife edge, as seen in Mohr, since this is one of numerous orientations that would work.

With regards to claim 9, Soderkvist stops feeding at about 1μm instead of the claimed "few μm". This is a known results-effective variable. One could make it smaller, to save feeding time, or one could making it larger, to decrease the chance of the knife being broken. It would have been obvious to one of ordinary skill in the art to have chosen any number of spacings, including a "few μm", dependent upon his desire for speed, his safety requirements and his slice thickness settings.

With regards to claim 9, if it is perceived that Soderkvist's feed is not "linear", then Examiner notes that this is ubiquitous in the art. See, for example, Niesporak et al.'654, Jakobi et al.'977 and many more of record. It would have been obvious to one

of ordinary skill in the art to have made Soderkvist's feed linear, if it isn't already, since this is the predominate way of doing it in the art.

With regards to claim 4 (not argued separately),, any light barrier emits electromagnetic radiation. Appellant's range-within-a-range limitations of a laser or LED is not considered to further limit the claims. If Appellant would like Examiner to give weight to the laser or LED, Appellant should change the claim the laser or LED outside of a range-within-a-range. Nevertheless, Examiner takes Official Notice that it is well known to employ lasers or LEDs in light barriers, and It would have been obvious to one of ordinary skill in the art to have used a laser or LED in Soderkvist's light barrier.

With regards to claim 7 (not argued separately), Soderkvist drives the specimen at different speeds (note the coarse feed of lines 3-11, column 3 and the fine feed of lines 13-15 of column 3). If there is any doubt that Soderkvist discloses different feed speeds, then Examiner notes that this is well known as seen in Niesporak '654 (abstract). It would have been obvious to one of ordinary skill in the art to have provided Soderkvist with a coarse feed speed and a different slicing speed, as taught by Niesporak, in order to decrease the time spent not cutting.

(10) Response to Argument

Appellant has only argued independent claim 9. Accordingly, Examiner will not be addressing limitations found in the dependent claims.

Arguments against Rejection #1 using Niesporak et al.'654 as the base reference.

Argument #1 (pages 5 and 6) - Appellant argues that Niesporak, by himself, does not make the invention obvious. This much is known. That is why Examiner employed additional references.

Argument #2 (pages 7 and 8) – Appellant argues that Walter et al.'653, Pfeifer '657, Sitte '234, Sitte '224 and Jakobi et al.'977 do not show the light barrier in the same location as claimed in claim 9. This is known. Examiner is merely trying to educate the reader such that they would know that same things that one of ordinary skill would know, namely that light barriers are useful in microtomes for sensing and controlling the motions of various parts. Examiner has employed numerous references here to make clear that light barriers are common in microtomes, and therefore it is unlikely that one of ordinary skill in the art would not be aware of the efficacy of light barriers in microtomes.

In regards to establishing the level of ordinary skill in the art, Examiner notes that the manufacturing of microtomes is a highly competitive and international business. An inventor working in this field would have a B.S. or Masters in Mechanical Engineering and at least several years experience designing microtomes for one of these companies. As with all mechanical engineers, he or she would be aware of numerous different possible sensors including light barriers.

Examiner further notes that Mohr '886 *does* show the light barrier in the same location as claimed in claim 9. Figure 6 shows a light barrier (14) parallel to the knife edge and between the knife (7) and the workpiece (stack beneath blade).

Argument #3 (pages 8-11) – Appellant argues that the references to Markgraf et al.'848, Naab '392, Kramer et al.'763, Mohr '886, Nishimoto '776, Guttler '970, Hannen et al.'719, and Weinheimer '135 are non-analogous art. In regards to Markgraf et al.'848, Naab '392, Kramer et al.'763, Guttler '970, Hannen et al.'719, and Weinheimer '135, Examiner is, again, merely enlightening the reader about what one of ordinary skill in the art (a mechanical engineer) would know, namely that light barrier sensors and contact sensors are known equivalents for sensing workpieces and machine parts and controlling the motion thereof. As seen by the numerous references (even more are available), the knowledge of this equivalency is so ubiquitous that even the most closeted specialist would catch the drift.

As seen in the rejection, Examiner draws special attention to Mohr '886 and Nishimoto '776. Mohr is considered to be analogous art since he is concerned with the same problem as Niesporak and Appellant, namely using light barriers to position the knife and the workpiece prior to initiation of the cutting action. Nishimoto is also considered to be analogous art since it is concerned with slicing off the leading edge of a biological material, just like Niesporak and Appellant, and because he uses a light barrier to sense the biological material to control the operation of the device, similar to Appellant.

Argument #4 (pages 11 and 12) – Appellant argues that the proposed modification of Niesporak would change the invention's principle of operation. Examiner completely disagrees. Changing from one known type of sensor (contact) to another

type of known sensor (light barrier) to perform the same function most certainly *does not* "change the principle of operation" of the device.

Further claim analysis by the Examiner – Appellant's arguments were rather focused, and did not touch upon some of the broader questions, such as "what does the prior art, as a whole, suggest to one of ordinary skill". To analyze this question, Examiner will break down claim 9 (parts in bold) and discuss (in non-bold) how one of ordinary skill views each piece of the claim.

An ultramicrotome – There are definitely size differences between a microtome (presumably Niesporak) and an ultramicrotome (Appellant's device), as discussed by Barrett et al.'075 on lines 61-63, column 2. However, the teaching of one convey to the other, and Appellant has not argued against the conveyance of teachings.

comprising: a knife, defining a knife edge, a knife holder for clamping the knife, - Niesporak shows a knife (10) defining a knife edge (14) and a knife holder (12) for clamping the knife. The Webster's II definition of "clamping" is "a device for joining mechanical parts" or "to fasten as if with a clamp". Niesporak discusses fastening the knife to the knife holder on line 4 of column 4, and this is considered to be "clamped". Appellant has not argued this point, nor should he, since knife clamps are ubiquitous in microtomes.

a specimen holder for holding a specimen, - Niesporak shows a specimen holder (51) for holding a specimen (22). Appellant has not argued this point.

a feed device for generating a relative linear motion between the knife and the specimen, - Niesporak shows a horizontal linear feed drive (50) and also a vertical linear feed drive (53). Appellant has not argued this point.

a light barrier – Niesporak has a contact sensor instead of a light barrier sensor. As discussed above, one of ordinary skill in the art knows that light barriers and contact sensors are recognized equivalents. One of ordinary skill would also be aware of the efficacy of light barriers within microtomes. Appellant has argued these points, but there are so many references that indicate otherwise that Examiner is not convinced by Appellant's arguments.

being arranged parallel to the knife edge – Assuming that it is obvious to replace Niesporak's contact sensor with a light barrier sensor, is it further obvious to make it parallel to the knife edge? Mohr has the light barrier arranged *between* the knife and the workpiece. Mohr wisely has placed his light barrier *parallel* to the knife edge, as seen in figure 6, since this gives the most accurate indication of whether or not the knife and workpiece would collide during prepositioning. From the teaching of Mohr, Examiner concludes that yes, it is obvious to place the light barrier parallel to the knife edge.

and located between the knife and the specimen, - Niesporak's contact sensor is between the knife and the specimen, so it is logical that a replacement light barrier would be as well. The teachings of Mohr are also applicable here.

the arrangement of the light barrier is such that the relative linear motion between the knife and the specimen penetrates the light barrier – Niesporak's

contact sensor is "penetrated" by the specimen, and the replacement light barrier also would be penetrated by the specimen. Of course, light barriers don't work if they are never penetrated, so it is obvious to have the specimen penetrate it.

and thereby ascertains a spacing of a few micrometers between the knife and the specimen to prevent contact between the knife and specimen, - Niesporak does not discuss how close the coarse feed movement gets to the knife before switching to fine feed mode. Logically speaking, one would like to get as close as possible without contacting the blade before starting the fine feed of the cutting cycles, in order to save time. Soderkvist's coarse feed gets as close as one micrometer. Given the logic of the situation and Soderkvist's teaching, one of ordinary skill would realize that anything in the 1-10 micrometer range would work fine. Examiner notes that Appellant has not argued this point.

and to facilitate the cutting of specimen sections that are 300 nanometers or less thick. – This refers to the thin-cutting of an ultramicrotome versus a microtome, and Examiner has addressed this above.

Arguments against Rejection #2 using Soderkvist '838 as the base reference.

Argument #1 (pages 13 and 14) - Appellant argues that Soderkvist, by himself, does not make the invention obvious. This much is known. That is why Examiner provided additional references.

Examiner notes a misstatement by Appellant. Appellant stated that Soderkvist's knife "never penetrates the light beam". This is incorrect, as seen in figure 1, where the light beam hits the knife *and* the workpiece. Note that claim 9 does not require the knife or the workpiece to *block* the light beam, it merely requires it to *"penetrate"* the light beam, which Soderkvist does.

Argument #2 (page 14) - Appellant argues that Jakobi et al.'977 does not show the light barrier in the same location as claimed in claim 9. This is known. Examiner is merely trying to educate the reader such that they would know that same things that one of ordinary skill would know, namely that light barriers are useful in microtomes for sensing and controlling the motions of various parts. See above for a discussion of the level of ordinary skill.

Examiner further notes that Mohr '886 *does* show the light barrier in the same location as claimed in claim 9. Figure 6 shows a light barrier (14) between the knife (7) and the workpiece (stack beneath blade).

Argument #3 (pages 15 and 16) – Appellant argues that the references to Mohr '886 and Nishimoto '776 are non-analogous art.

As discussed above, Mohr is considered to be analogous art since he is concerned with the same problem as Soderkvist and Appellant, namely using light barriers to preposition the knife and the workpiece prior to initiation of the cutting action. Nishimoto is also considered to be analogous art since it is concerned with slicing off

thin layers of a biological material, just like Soderkvist and Appellant, and because he uses a light barrier to sense the biological material to control the operation of the device, similar to Appellant.

Further claim analysis by the Examiner – Similar to the previous rejection, Examiner will break down claim 9 (parts in bold) and discuss (in non-bold) how one of ordinary skill views each piece of the claim.

An ultramicrotome – Soderkvist is an ultramicrotome (see abstract).

comprising: a knife, defining a knife edge, a knife holder for clamping the knife, - Soderkvist shows a knife (figure 2) defining a knife edge and a knife holder (19) for clamping the knife. The Webster's II definition of "clamping" is "a device for joining mechanical parts" or "to fasten as if with a clamp". Soderkvist's knife is clearly fastened to the knife holder as seen in figure 2, and this is considered to be "clamped". Appellant has not argued this point, nor should he, since knife clamps are ubiquitous in microtomes.

a specimen holder for holding a specimen, - Soderkvist shows a specimen holder (15) for holding a specimen (2). Appellant has not argued this point.

a feed device for generating a relative linear motion between the knife and the specimen, - Soderkvist discusses a feed drive on lines 3-17 of column 3. If this is perceived to be a non-linear feed drive, Examiner notes that such are predominate in the art as discussed above. Appellant has not argued this modification.

a light barrier – Soderkvist has a light barrier sensor as seen in figures 1 & 2.

being arranged parallel to the knife edge – Soderkvist employs a light barrier that is perpendicular to the knife edge and employs a complicated light analysis based on light wavelength. As discussed above, there are simpler and cheaper light barriers used in similar situations, such as with Jakobi, Mohr and Nishimoto, who are all deemed to be analogous art. Accordingly, it would be obvious to replace Soderkvist's expensive perpendicular light barrier with a cheaper and simpler light barrier, in order to save costs. It would have been obvious to place such a cheaper light barrier *parallel* to the cutting edge, as seen in Mohr. Mohr wisely has placed his light barrier *parallel* to the knife edge, as seen in figure 6, since this gives the most accurate indication of whether or not the knife and workpiece would collide during prepositioning. From the teaching of Mohr, Examiner concludes that yes, it is obvious to place the light barrier parallel to the knife edge. Soderkvist's functionality is maintained.

and located between the knife and the specimen, - Soderkvist's contact sensor is between the knife and the specimen, so it is logical that the cheaper replacement light barrier would be as well. The teachings of Mohr are also applicable here.

the arrangement of the light barrier is such that the relative linear motion between the knife and the specimen penetrates the light barrier – Soderkvist's light barrier is "penetrated" by the specimen, and the cheaper light barrier also would be penetrated by the specimen. Of course, light barriers don't work if they are never penetrated, so it is obvious to have the specimen penetrate it.

and thereby ascertains a spacing of a few micrometers between the knife and the specimen to prevent contact between the knife and specimen, - Logically speaking, one would like to get as close as possible without contacting the blade before starting the fine feed of the cutting cycles, in order to save time. Soderkist's coarse feed gets as close as one micrometer. Given the logic of the situation and Soderkvist's teaching, one of ordinary skill would realize that anything in the 1-10 micrometer range would work fine. Examiner notes that Appellant has not argued this point.

and to facilitate the cutting of specimen sections that are 300 nanometers or less thick. – An ultramicrotome inherently cuts slices 300 nanometers thick, as discussed by Barrett.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Ken Peterson

KENNETH E. PETERSON
PRIMARY EXAMINER

Conferee Supervisory Patent Examiner Boyer Ashley

Conferee Supervisory Patent Examiner Monica Carter